

300825

October 14, 2004

Federal Highway Administration
U.S. Department of Transportation
Dockets Management Facility
Room PL-401
400 Seventh St., SW
Washington, DC 20590

RE: Docket No. FHWA-2003-15149 - 22

Dear Mr. Hatzl,

Thank you for the opportunity to respond to the subject docket. We offer these comments not only as a leading supplier of highway safety materials but also as a company that operates a large transportation fleet and that is a major user of highway and transportation resources. 3M maintains a fleet of over 5200 vehicles -- including cars, vans and large trucks. In order to keep our customers and factories supplied with goods our drivers are often on the road at night. These drivers depend on signs that are well designed and well maintained to communicate information essential to safely and efficiently negotiate the roads.

We believe we have a stake in our nation's transportation system and a keen interest in the decisions that help form our nation's transportation policy. That interest carries with it a responsibility to participate and contribute to the process, and it is in this spirit that we offer the following.

We support establishing minimum levels of retroreflectivity for traffic signs to promote safety, enhance traffic operations and facilitate comfort and convenience for all drivers. We believe that the levels of reflectivity included in the Notice of Proposed Amendment (NPA) correspond to a level of sign performance that is quite low. Signs with reflectivity this low do not serve the needs of a large percentage of drivers.

We encourage the inclusion of the minimum levels of retroreflectivity directly in the MUTCD as a Standard, with Options and Guidance addressing methods to maintain this level of performance.

We recognize proper sign maintenance as an economic benefit to signing agencies and urge a more rapid phase-in period of the Standard to realize gains more quickly.

Finally, we offer a suggestion to make the standard more meaningful and more easily adaptable in the future by including retroreflective performance requirements at 0.5° observation angle.

The proposed levels of reflectivity are low

The NPA states that the purpose of traffic control devices, as well as principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users. The proposed levels of reflectivity do not serve “all road users”.

The assumptions used in the research cited in the NPAⁱ result in requirements that are inadequate for a large percentage of drivers. These assumptions include:

- Completely dark surroundings with no glare and no visual complexity
- Straight, flat roads with signs mounted normal to the road – no curves or hills
- A vehicle equivalent to a Sport Utility Vehicle – no large trucks
- A driver 55 years old – no elderly drivers

These assumptions pose a scenario far less demanding than are often encountered. Signs with the proposed minimum levels of reflectivity will not meet the needs of drivers in many situations. Even using these advantageous conditions, one half of all drivers are expected to be unable to read the signs due to insufficient luminance. We do not endorse the proposed values as a guarantee to serve drivers' needs, but we support them as a first step in recognition of those needs by eliminating the most unacceptable signs.

As highlighted in the NPA, reflectivity alone does not ensure visibility. Short sight distances, disadvantaged sign locations, large vehicles, older drivers, poor weather conditions, small sign legends, misaimed headlamps, driver distractions and the like can create common situations with higher needs for retroreflectivity. Signs that meet the proposed minimums are not guaranteed to be adequate, but by basing the proposed minimums on research with benchmark assumptions so generous, signs that fail to meet this minimal level of reflectivity are certain to be inadequate.

The Minimum Levels should be a required as a Standard

It is understood that traffic signs Shall be reflectorized or illuminated in accordance with Section 2A.08 to satisfy the requirements for color and shape 24 hours per day. It is also acknowledged that different materials used to reflectorize signs result in different levels of performance. A simple question is

then, “How much reflectorization is enough to satisfy the requirements for 24-hour legibility?”

As noted above, the level of retroreflectivity proposed in the NPA does not represent an extravagant amount of sign brightness -- far from it. The proposed levels do not ensure that even 50% of drivers will be accommodated. The proposed tables represent a measure so low as to be considered bare minimums of performance for the signs to be remotely effective at night. A sign that does not exhibit this level of reflectivity cannot be considered adequately visible and therefore cannot satisfy many other requirements contained in the MUTCD.

For this reason the Minimum Levels of Retroreflectivity should be made a standard (shall) condition. Support can be offered in the methods used to maintain these levels, but the levels themselves should be held as a requirement. Procedures and methods that do not result in maintaining this low level of Retroreflectivity for signs should be considered failures. To be a truly effective motivator and measure of effective sign management practice, the reflectivity levels must be a Standard.

Guidance should then be developed to help agencies provide Traffic Control Devices that serve the largest percentage of road users possible. Maximizing retroreflectivity has proven to be a highly cost-effective means for improving road safety and efficiency. Policy makers should be encouraged to improve signs and markings -- not simply eliminate the most poorly performing specimens. Providing Guidance to promote the most effective devices and a Standard to eliminate the worst performers will result in safer, more efficient roads.

The exclusion of signs intended for pedestrians is acceptable. Excluding blue and brown signs is not. Blue and brown signs are intended for use both day and night. The NPA explains that these signs are being excluded because there is a lack of data on which to base a requirement. A preferable means of addressing this situation is to create another “placeholder” in the MUTCD until more data is available and the table of minimums can be updated.

The MUTCD is the proper source for information

The MUTCD is the primary reference used by those responsible for the design, installation and maintenance of traffic control devices. The current edition has a placeholder designated for the reflectivity of signs. This placeholder is in the proper location for the Table of Retroreflectivity Minimums.

A separate, detailed set of information relating to the maintenance of these minimums would be helpful, but the MUTCD should include this “bottom line” information. The requirements for nighttime visibility have been included in the MUTCD since the first edition in 1935. Users expect to find this information in the MUTCD. This is where it belongs.

The Sooner the Better

In a paper published in 2002, Ford and Calvert evaluated a sign maintenance management system in Mendocino County Californiaⁱⁱ. They estimate a cost: benefit ratio of up to 1:299. For an investment of under \$100,000 in sign maintenance, millions of dollars were saved by dramatically reducing the incidence of crashes. Douglas Ripley, sites this and other similar results in his review of safety studies presented at the TRB earlier this year.ⁱⁱⁱ

Quite simply, maintaining signs saves money. The sooner the requirement is phased in, the sooner this economic benefit will be realized.

Simplifying the Requirements

The proposed Table of Minimum Retroreflectance is more complicated than it needs to be. It includes different requirements for different types of sheeting. But the drivers' needs don't depend on the sheeting type used. The confusion is introduced by "translating" the drivers' needs described at one geometry – using 0.5° observation angle, into requirements for reflectivity at another geometry – using 0.2° observation.

The reason for using this translation is presumably because traditionally, portable retroreflectometers measuring at a single geometry used 0.2° as a default setting. Recent developments in understanding of how drivers use signs indicate that performance at an angle of 0.5° and higher are more important. Drivers read signs at a distance of about 30-40 feet per inch of letter height. This distance corresponds to an observation angle of roughly 0.5° in cars, and higher in trucks.

Basing the standard on current instruments rather on good science is a bad idea. If sign maintenance is successfully carried out, no portable retroreflectometer readings are actually required at all. Further, there are no barriers to developing portable retroreflectometers that read at 0.5°. Using this more direct method to assess sheeting's ability to satisfy drivers' needs eliminates the need to identify the sheeting type in the Table of Minimum Reflectivity. Using 0.5° is more straightforward and easier to understand than using 0.2° translated by sheeting type. Even more importantly, existing materials (like Type IV) and new materials can be accommodated as needed without revising the table.

If FHWA is concerned that the lack of instrumentation is an issue, the 0.2° observation angle table could be maintained along with those at 0.5° until more 0.5° instruments are widely available.

Respectfully submitted,

TCBliss
Traffic Safety Systems Division

ⁱ Carlson, P.J. and Hawkins, H.G., *Updated Minimum Retroreflectivity Levels for Traffic Signs*, FHWA-RD-03-081, FHWA Washington, DC, 2003.

ⁱⁱ Ford, Stephen H, Calvert, Eugene C., *Evaluation of a Low Cost Program of Road System Traffic Safety Reviews for County Highways*, November 30, 2002

ⁱⁱⁱ Ripley, Douglas, *The Safety Effects of Traffic Sign Upgrades*, ITE Annual Meeting, Lake Buena Vista, 2004